NATURAL FORCES OF THE CHANGING CLIMATE: a Review of Current Research

by Albert Jacobs
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It would have been appropriate in terms of the "scientific method" for the type of commissioned research as practiced by the Intergovernmental Panel on Climate Change (IPCC) to attempt making a quantitative assessment of all natural causes of climate change before attaching much of the blame to humanity. But such was not the political purpose of the IPCC's founders.

There are many studies that show a high degree of correlation between solar magnetic activity and temperatures over thousands of years. The evidence shows that solar activity explains 50% to 80% of the past climate change. The IPCC ignores the overwhelming evidence of solar influences on climate. In science, the evidence always trumps theory. The scientific method absolutely requires that both solar and anthropogenic variables be considered in explaining climate change.

The climatology world is preoccupied with discussions about atmospheric conditions. We are convinced that there is no proper scientific justification for blaming carbon dioxide as the principal cause of any global warming, let alone at a catastrophic level.

Perspectives from disciplines that have been left under-explored include geology, oceanography and extra-terrestrial influences. The independent science world is certain that the variations in solar activity are playing a major direct and indirect role and is still looking for the 'mechanism' by which this is occurring and transmitted to earthly climate.

Nothing new in that. The idea is centuries old and the connection between solar behaviour and climate on earth has been mentioned in antiquity. More recently a number of fields of research have yielded tangible results although any Grand Explanation is elusive. There are a number of separate, often cyclic forces at work, both in the solar system and on the earth itself.

☼ Over geologic time large shifts have taken place in the location and distribution of continents and oceans, with concomitant changes in atmospheric and oceanographic characteristics and climates. The "new" shallow seas of the Cambrian resulted in a sudden explosion of life forms. At other times, geologic and other upheavals caused mass extinction at various times throughout the earth' history.

☼ About a century ago, Milankovitch calculated the combined effect of the ~ 24,000, 40,000 and 100,000 year cycles, relating to axial precession, axial tilt and orbital eccentricity of the earth. In a general way this explained the occurrence and timing of the main Pleistocene Ice Ages.

☼ In 1965 Paul Jose published in *The Astronomical Journal* V 70/3 his findings on the motions of the sun around the centre of gravity of the solar system which are governed by the orbits of the larger planets (Jupiter, Saturn, Uranus, Neptune) around the sun. This solar motion is called Solar Inertial Motion (SIM). Several others (Fairbridge, Landscheidt, Wilson) took up this lead. Ivanka Charvátová refined this concept in a number of papers and a presentation at the 2010 AGU meeting. An important finding was that the 179 year cycle in the SIM, already mentioned by Jose, had a climate consequence. The distinction in the cycle is between "ordered" movements, opposed to "disordered" patterns of SIM. The latter correlate with the Wolf, Spörer, Maunder and Dalton phases of the Little Ice Age.

☼ In 1991 Friis-Christensen and Lassen established that the length of the solar cycle is associated with climate.

☼ Svensmark's 2006 cloud chamber experiments indicated that cosmic rays (CR) act as a catalyst in making aerosols which can grow into cloud condensation nuclei. Water vapour condenses on these particles forming clouds. This result was later confirmed by the CERN Cloud Experiment in Geneva in 2011. The amount of cosmic rays received in the atmosphere would be effected by modulation of the CR flow by the solar wind (a stream of charged particles from the sun), thus varying cloud cover and surface temperature.

More solar activity -> more solar wind -> fewer received CRs -> less cloud cover -> higher surface temperatures.

☼ There are lots of theories about what causes the changes in solar activity. Let's first point out that solar physicists are not of one mind about what the interior of the sun looks like. The sun's ever-changing magnetic field probably powers the convection cells of which we see manifestation in the corona's sunspots and coronal mass ejections. DeJager and Duhau (2012) are showing that there is not one simple solar dynamo but two battling magnetic field expressions, an equatorial field and a polar field, interacting anti-phase and which are linking present behaviour to the current anemic solar cycle 24. One may suspect that some of the larger orbiting planets with their own magnetic fields may influence the play between the two solar fields from time to time.

☼ Be that as it may, the rhythms of the forces above our heads are reflected in our climate patterns. How do any links work?
Professor Ian Wilson's paper published in the General Science Journal, December 2011 a 'must see' for anyone interested in the topics within the subject. The connection is, according to him, observable through the Length of Day (LOD) variations from the normal trend.

The earthly LOD measures 86,400 seconds and varies by about three milliseconds over the last five decades (graph). It appears that the winter index of the North Atlantic Oscillation Index (NAO), of which the positive and negative phases relate closely to major weather patterns in the Atlantic area, correlates with the LOD variations.

The Pacific Decadal Oscillation (PDO), a major pattern that finds its expression in El Niño/La Niña amplitudes also correlates with LOD, but one has to go to the third order polynomial LOD to see it. Scafetta 2010 links LOD with the sun through the speed of the SIM movement and Ian Wilson and Bob Carter seem to agree in an ASA article. The 'Conclusions' in the Scafetta article are well worth reading. The debate continues.

☀ The 60 year climate cycle on earth can be followed from astronomy, as can the 179 year SIM cycle. If there is a consensus growing about a primary force, it is around the influence of the Jovian planets, their

mass and their magnetic fields, interfering in their orbits with the sun's SIM, its cycles and the "solar wind".

Some may say that there is no "proof". Experimentally derived or testable proof is rare in climate science. There is none to support the CO2 hypothesis either. The difference between those two competing explanations is that one depends on observation, the other on computer simulations.

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